



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,694	09/30/2003	Fufang Zha	USFMCR.066C2C1C	5086
20995	7590	01/12/2005	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			SORKIN, DAVID L	
			ART UNIT	PAPER NUMBER
			1723	

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/674,694

Applicant(s)

ZHA ET AL.

Examiner

David L. Sorkin

Art Unit

1723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9, 13-19 and 24-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 13-19 and 24-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 05/24/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-9 and 13-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Nowhere in the originally filed specification is it described that the "the feed liquid ... provided to the vessel at a rate sufficient to cause an overflow" comprises a fouling material. There is no reason to assume that "the feed liquid ... provided to the vessel at a rate sufficient to cause an overflow" comprises a fouling material. Many other scenarios are possible, including feeding clean water at a rate that causes overflow during a cleaning process, or feeding a solution that does not contain a fouling material to the vessel whereby a fouling material is created in the vessel. For example, especially considering that the specification states the vessel may be a bioreactor, nutrient solution not containing fouling material may be fed to the bioreactor wherein growth of microorganisms creates fouling material. Also, a chemical reaction within the vessel could result in a fouling material, though a liquid stream being fed into the vessel at a rate sufficient to cause overflow need not contain a fouling material. Many solutions, such as protein solutions, undergo changes (such as precipitation) as a result of concentration, and therefore though there is no fouling material in the feed stream, fouling material is created inside the vessel where concentration occurs.

Art Unit: 1723

3. Claims 1-9 and 13-19 are further rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement for the following reason.

Claim 1 now recites "providing a vessel" in line 3 and "wherein the membrane is contained within a separate vessel" in line 8. While it is unclear particularly what is required by the claims as discussed below, no such corresponding two separate vessels are described in the specification.

4. Claims 1-9, 13-19 and 24-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claims 1 and 24 are rendered indefinite by the limitation "wherein the module is positioned vertically in the vessel", because no requirement regarding the module sets forth a standard for evaluating if the module is vertically oriented. What part of the module is required to be up or down?

5. Claims 1-9 and 13-19 are further rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention for the following reasons. Claim 1 recites "providing a vessel" in line 3 and "wherein the membrane module is contained in a separate vessel". It is unclear how many vessels are required. It is unclear if "separate vessel" means separate from the first vessel or separate from the module. Subsequent references to "the vessel" are ambiguous as to which vessel is being referenced.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3, 4, 6-9 and 13-19 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 96/07470. Regarding claim 1, WO 96/07470 discloses a method for filtering a feed liquid comprising providing a vessel (11), providing a membrane module (12,13,14), the membrane module comprising a plurality of hollow fiber membranes (12), the membranes comprising a plurality of pores and an outer surface, wherein the membranes are mounted in a header (including 13 or 14) in close proximity to one another so as to prevent excessive movement therebetween, wherein the membranes form an array, wherein the membrane is configured such that gas bubbles can be introduced into the membrane module (see page 3, lines 20-22; page 10, lines 6-9), and wherein the membrane module is container within a separate vessel (11) ; providing a feed liquid to the vessel the feed liquid comprising a fouling material (see page 9, lines 9-16; page 16, lines 20-22), wherein the feed liquid is provided to the vessel at a rate sufficient to cause an overflow (see page 9, lines 9-16; Fig. 1); applying a transmembrane pressure to the membranes in the module, whereby filtrate passes through pores in the membranes, thereby producing in the vessel a concentrated feed comprising accumulated solids (see page 2, lines 1-3; page 4, lines 13-14; page 9, lines 9-16; page 16, lines 6-7); and removing the accumulated solids from the vessel,

Art Unit: 1723

wherein the accumulated solids are carried out of the vessel in the overflow therefrom (see page 9, 15-16; Figs. 1 and 2) at the top of the vessel. Regarding claim 3, the membranes are mounted relative to one another so as to produce a rubbing effected between the membranes with vibrates (see page 9, lines 2-10). Regarding claim 4, the hollow fiber membranes are arranged in at least one bundle (see page 9, lines 2-4). Regarding claim 6, gas bubbles are provided by from within the module through gas distribution holes or opening (the holes of membranes 12 passing through 13) in the header. Regarding claim 7, gas bubbles are provided through at least one tube (12) situated within the module. Regarding claim 8, the tube has a plurality of holes (see page 9, lines 2-5). Regarding claim 9, the tube comprises a comb of tubes (see Fig. 1). Regarding claim 13, scouring the membranes is disclosed (see page 3, lines 20-22). Regarding claim 14, the step of scouring comprises liquid backwashing (see page 11, lines 14-17). Regarding claim 15, the scouring comprises pressurized gas backwashing (see page 12, lines 6-9). Regarding claim 16, chemical cleaning is disclosed (see page 13, line 2). Regarding claim 17, chemical dosing is disclosed (see page 13, line 2). Regarding claim 18, the scouring is continuous (see page 4, lines 1-2). Regarding claim 19, the scouring is intermittent (see page 4, lines 1-2).

8. Claims 1, 3, 4, 6-9, 13, 16-19 and 24-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Cote et al. (US 5,248,424). Regarding claim 1, Cote ('424) discloses a method for filtering a feed liquid comprising providing a vessel (81), providing a membrane module (see col. 22, line 28), the membrane module comprising a plurality of hollow fiber membranes (12), the membranes comprising a plurality of

Art Unit: 1723

pores and an outer surface, wherein the membranes are mounted in a header (11) in close proximity to one another so as to prevent excessive movement therebetween, wherein the membranes form an array, wherein the membrane module is configured such that gas bubbles can be introduced into the membrane module (see col. 12, lines 3-6; col. 22, lines 24-29), and wherein the membrane module is contained within a separate vessel (see Fig. 6) and wherein the module is positioned vertically in the vessel; providing a feed liquid to the vessel the feed liquid comprising a fouling material (see col. 2, lines 17-35; col. 22, lines 18-33), wherein the feed liquid is provided to the vessel at a rate sufficient to cause an overflow (see page 22, lines 20-24; Fig. 6); applying a transmembrane pressure to the membranes in the module, whereby filtrate passes through pores in the membranes (see col. 3 lines 48 to col. 4 line 23), thereby producing, in the vessel, a concentrated feed comprising accumulated solid (see col. 3 lines 39-44); and removing the fouling material from the vessel, wherein the accumulated solids are carried out of the vessel in the overflow therefrom at the top of the vessel (see col. 3, lines 39-44; col. 22, lines 18-35; Fig. 6). Regarding claim 3, the membranes are mounted relative to one another so as to produce a rubbing effected between the membranes with vibrates (see Fig. 3). Regarding claim 4, the hollow fiber membranes are arranged in at least one bundle (see Fig. 3). Regarding claim 7, gas bubbles are provided through at least one tube (67) situated within the module. Regarding claim 8, the tube has a plurality of holes (see page col. 21, line 13). Regarding claim 9, the tube comprises a comb of tubes (see Fig. 4). Regarding claim 13, scouring the membranes is disclosed (see col. 10, lines 15-27). Regarding claim

Art Unit: 1723

16, chemical cleaning is disclosed (see col. 7, lines 49-55). Regarding claim 17, chemical dosing is disclosed (see col. 7, lines 49-55). Regarding claim 18, the scouring is continuous (see col. 5, lines 42-43). Regarding claim 19, the scouring is intermittent (see col. 5, lines 42-43). Regarding claim 24, Cote ('424) discloses a method of removing accumulated solids from an outer surface of a plurality of hollow fiber membranes (12), the method comprising providing a plurality of porous hollow fiber membranes (12) extending longitudinally in an array to form a membrane module, wherein the membranes are arranged in close proximity to one another and mounted to prevent excessive movement therebetween, where the module is contained within a separate vessel (81), and wherein the module is positioned vertically in the vessel; providing from within the array, by means other than gas passing through the pores of the membranes, uniformly distributed gas bubbles, the distribution being such that the bubbles pass substantially uniformly between each membrane in the array to scour the surface of the membranes, vibrate the membranes, and remove accumulated solids from within the membrane module (see col. 10, lines 15-27; col. 21 lines 6-15; Fig. 4); and removing accumulated solids from the vessel, wherein the accumulated solids are carried out of the vessel in an overflow therefrom at the top of the vessel (see col. 3, lines 39-44; col. 22, lines 18-35; Fig. 6). Regarding claim 25, the membranes are mounted vertically to form the array and the bubbles pass generally parallel to a longitudinal extent of the fibers (see Figs. 3, 4 and 6). Regarding claim 26, the uniformly distributed gas bubbles are provided at a lower end of the array (see Figs. 3, 4 and 6).



***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 96/07470 in view of Ohkubo et al. (US 4,876,006). The method of WO 96/07470 was discussed above with regard to claim 4. The bundle of WO 96/07470 is not surrounded by a perforated cage. Ohkuba ('006) teaches surrounding a hollow fiber membrane bundle with a perforated cage (9) (see col. 3, lines 6-34). It is considered that it would have been obvious to one of ordinary skill in the art to have surrounded the bundle of WO 96/07470 with a perforated cage as taught by Ohkuba ('006) to protect the hollow fiber membranes (see col. 3, lines 6-34).

11. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cote et al. (US 5,248,424) in view of Mahendran et al. (US 5,639,373). The method of Cote ('424) was discussed above with regard to claim 1. In Cote ('424) gas bubbles are provided through a separate header connected to a pressurized gas source, not through "the header" in which the membranes are mounted. Mahendran ('373) teaches providing the bubbles through a header (101) in which membranes are mounted (see Fig. 5; col. 19, lines 8-31). It is considered that it would have been obvious to one of ordinary skill in the art to have provided the bubbles of Cote ('424) through the header in which the membranes are mount as taught by Mahendran ('373), because the

Art Unit: 1723

Mahendran ('373) reference explicitly presents itself as an improvement upon the method of Cote ('424) (see col. 1, lines 8-13).

### ***Response to Arguments***

12. Applicant argues that one should read limitations into the term "feed liquid" and assume the term requires a fouling material; however, the examiner disagrees. There are many situations where liquid not containing a fouling material is fed to a vessel having a membrane module. Several examples of such situations are explained above.

13. WO 96/07470 discloses the membrane module contained in a separate vessel 11 and removing accumulated solid out an overflow from the top of the vessel at 17.

14. Applicant argues (regarding Cote '434) that the instant claims are limited to exactly the listed steps and that a method comprising an addition step of "reintroducing" into the vessel would be outside the scope of the claims; however the claims expressly include the word "comprising" and therefor may include additional steps, such as reintroducing.

### ***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not


Art Unit: 1723

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Sorkin whose telephone number is 571-272-1148. The examiner can normally be reached on 9:00 -5:30 Mon.-Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L. Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
David L. Sorkin  
Primary Examiner  
Art Unit 1723

DLS